Amendments to the Claims:

Please replace the pending claims with the following listing of claims, which supersedes all prior versions and listings of claims in the application:

Listing of Claims:

Claim 1. (original) An optical data signal processing system comprising

an optical signal router comprising a plurality of optical switches arranged in a connection structure, each switch having at least one optical input port, at least a first and a second optical output port, and an optical control port for controlling the optical connection of a switch input port to one of the switch's output ports,

an optical control generator comprising a plurality of electrically controlled optical energy sources, each source being optically connected to at least one of said optical control ports, each source having an electrical signal input control port and an optical energy output port in response thereto, and

a processor translation system for flexibly generating and controlling electrical signals input to a plurality of said electrical control ports of said optical sources for configuring said connection structure for managing the optical route of an optical data input signal through the processing system to a processing system selected output.

Claim 2. (original) The optical signal processing system of claim 1 wherein said processor translation system comprises a processor for implementing software instructions for:

accepting a protocol specification that includes a plurality of specifications of element input/output relationships, wherein the specifications of at least some of the elements are in terms of sequences of other of the plurality of elements,

associating portions of said specification with control levels of said electrical signals; and

for each of the associated portions providing instructions to said processor, the instructions for setting said associated control levels for controlling at least some of said optical sources.

Claim 3. (original) The system of claim 2 wherein accepting the protocol specification includes accepting a specification for a logic structure protocol.

Claim 4. (original) The system of claim 2 further comprising instructions for processing the protocol specification to produce executable software that implements associating the control lines with elements specified in the specification.

Claim 5. (original) The system of claim 2 wherein the specification includes an object-oriented specification of elements.

Claim 6. (original) The system of claim 2 wherein the specification includes for at least some of the elements an association of a numerical value identifying said element with a symbolic name for said element.

Claim 7. (original) The system of claim 2 further comprising instructions for processing the specification to produce a hardware description, and deriving from said hardware description the electrical control signals.

Claim 8. (original) The system of claim 3 wherein accepting the logic structure specification comprises accepting sufficient information for unambiguously processing the specification for associating different portions of the specification with different control lines of the optical sources.

Claim 9. (original) The system of claim 1 wherein said processor translation system comprises

a protocol translation system for receiving a protocol specification regarding incoming packets of data over an optical system and outputting electrical control signals to the optical control generator, for causing said generator to output generator optical signals for configuring optical switches of the optical signal router through said optical sources.

Claim 10. (original) The system of claim 9 further wherein said processor translation system acts through said optical control generator to configure a first portion of said optical switches as an optical processor for optically processing optical data of an optical data input packet in accordance with said protocol specification for determining the destination of said packet, and

said first portion of said optical switches provides optical control signals to a second portion of said optical signal router for directing said input optical signal to the processing system output port identified by said optical processor.

Claim 11. (original) The system of claim 10 wherein said second portion of said optical signal router has a configuration of a binary tree structure.

Claims 12. (original) The system of claim 11 wherein said first portion of said optical switches operates to control the operation, at any one time, of less than all of said second portion of said optical switches.

Claim 13. (original) The system of claim 12 wherein the number of second portion optical switches being controlled, at any one time, is N where (2^N-1) is less than the number of output destination ports of the system.

Claim 14. (original) The system of claim 1 wherein said optical signal router comprises

a first level optical configuration processor, and

a second level optical signal path configuration processor,

said first level optical processor having a structural configuration, which, in response to optical signals from the optical control generator optical energy output port, enables said first level processor to receive and optically decode optical input packets of an optical data input signal,

said second level optical processor, in response to optical signals from said first

level processor, providing an optical path from an optical data input to the processing system selected output.

Claim 15. (original) The optical signal processing system of claim 14 wherein said processor translation system comprises a processor for implementing software instructions for:

accepting a protocol specification that includes a plurality of specifications of element input/output relationships for decoding received input packets,

associating portions of said specification with control levels of said electrical signals; and

for each of the associated portions providing instructions to said processor, the instructions for setting said associated control levels for controlling an interconnection configuration of at least some of said optical sources.

Claim 16. (original) The system of claim 15 wherein accepting the protocol specification includes accepting a specification for a logic structure protocol.

Claim 17. (original) The system of claim 15 further comprising instructions for processing the protocol specification to produce executable software that implements associating the control lines with elements specified in the specification.

Claim 18. (original) The system of claim 15 wherein the specification includes an object-oriented specification of elements.

Claim 19. (original) The system of claim 15 further comprising instructions for processing the specification to produce a hardware description, and deriving from said hardware description the electrical control signals.

Claim 20. (original) The system of claim 14 further wherein said second level optical processor has a configuration of a binary tree structure.

Claim 21. (original) The system of claim 20 further wherein said first level optical processor provides less than N+1 deterministic optical signals to the second level optical processor, where N has a value such that (2^{N-1}) is less than the number of output destination ports of the processing system, and N is greater than 2.

Claim 22. (original) The system of claim 14 further comprising

a look-up table storing at each of a plurality of addressable locations, a control word for controlling the optical signals to be sent by said first level processor to said second level processor, and

said first level processor determining a location to select in response to optically decoding an incoming optical data packet.

Claim 23. (original) An optical data signal processing method comprising

arranging a plurality of optical switches in a connection structure, each switch having at least one optical input port, at least a first and a second optical output port, and an optical control port for controlling the optical connection of a switch input port to one of the switch's output ports,

optically connecting each of a plurality of electrically controlled optical energy sources to at least one of said optical control ports,

connecting to each source an electrical signal input control signal and providing an optical energy output signal in response thereto; and

flexibly generating and controlling electrical signals input to at least a plurality of said optical sources for managing the optical route of an optical data input signal through the processing system to a processing system selected output.

Claim 24. (original) The method of claim 23 further comprising

receiving a protocol specification regarding incoming packets of data being input over an optical system, and

outputting the electrical control signals to the energy sources, for causing said sources to

output optical signals for configuring the optical switches.

Claim 25. (original) The method of claim 24 further comprising

configuring a portion of said optical switches as an optical processor for optically processing optical data of an optical data input packet in accordance with said protocol specification for determining the destination of said packet, and

providing optical control signals for directing said input optical signal to an identified destination.

Claim 26. (original) The method of claim 24 further comprising

receiving a second protocol specification regarding incoming packets of data being input over the optical system, and

outputting a second set of electrical control signals to the energy sources for reconfiguring the outputs of said sources, for causing said sources to output optical signals for reconfiguring the optical switches.

Claim 27. (original) An optical data signal processing system comprising

router means comprising a plurality of optical switch means arranged in a connection structure, each switch having at least one optical input port, at least a first and a second optical output port, and an optical control port for controlling the optical connection of a switch input port to one of the switch's output ports,

an optical control generator means comprising a plurality of electrically controlled optical energy source means, each source means being optically connected to at least one of said optical control ports, each source means having an electrical signal input control port and an optical energy output port in response thereto; and

means for flexibly generating and controlling electrical signals input to at least a plurality of said control ports of said optical source means for managing the optical route of an optical data input signal through the processing system to a processing system selected output.

Claim 28. (original) The system of claim 27 wherein said generating and control means comprises

means for receiving a protocol specification regarding incoming packets of data over an optical system, and

means for outputting the electrical control signals to the optical control generator means, for causing said sources to output optical signals for configuring the optical switches.

Claim 29. (original) The system of claim 28 further comprising

means for configuring a portion of said optical switches as an optical processor for optically processing optical data of an optical data input packet in accordance with said protocol specification for determining the destination of said packet, and

means for providing optical control signals for directing said input optical signal to the system output port identified by said protocol translation system.

Claim 30. (original) An optical data signal processing system comprising

means for arranging a plurality of optical switches in a connection structure, each switch having at least one optical input port, at least a first and a second optical output port, and an optical control port for controlling the optical connection of a switch input port to one of the switch's output ports,

means for optically connecting each of a plurality of electrically controlled optical energy sources to at least one of said optical control ports,

means for connecting to each source an electrical signal input control signal and providing an optical energy output signal in response thereto; and

means for flexibly generating and controlling electrical signals input to at least a plurality of said optical sources for managing the optical route of an optical data input signal through the processing system to a processing system selected output.